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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,355	04/19/2004	Tomojiro Sugimoto	119492	1084

7590 05/04/2005
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EXAMINER

BARNEY, SETH E

ART UNIT PAPER NUMBER

3752

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,355

Applicant(s)

SUGIMOTO ET AL.

Examiner

Seth Barney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/19/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-10 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/19/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 10 is objected to because of the following informalities: Line 10 of the claim appears to be missing --a-- after "means is". Appropriate correction is required.
2. Claim 8 objected to because of the following informalities: Line 3 of the claim appears to be missing --the-- after "pre-rotation to" and after "so that". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claim 10 recites the limitation "guide groove" in line 11 of the claim. There is insufficient antecedent basis for this limitation in the claim. It appears from the specification the "guide groove" claimed is reference number (12) and is called guide protrusions on page 12.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,089,473 to Keim.

Regarding claim 1, Keim discloses a fuel injection valve in which a nozzle hole (22) is formed on metering plate (21) and fuel flowing on a face on the upstream side of

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the metering plate of the metering plate is injected outside of a face on the downstream side of the metering plate, the fuel injection valve comprising a vortex flow generator means (23) for making a flow of fuel passing in the nozzle hole form into a vortex flow, wherein the vortex flow generating means is provided on the upstream side of the metering plate. See Figure 4.

Regarding claim 9, the vortex flow generating means is a guide protrusion formed on an upper face of the metering plate. See Figure 4.

6. Claims 1, 2, and 4-8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,170,763 to Fuchs et al.

Regarding claim 1, Fuchs discloses a fuel injection valve in which a nozzle hole (39) is formed on metering plate (36) and fuel flowing on a face on the upstream side of the metering plate of the metering plate is injected outside of a face on the downstream side of the metering plate, the fuel injection valve comprising a vortex flow generator means (40) for making a flow of fuel passing in the nozzle hole form into a vortex flow, wherein the vortex flow generating means is provided on the upstream side of the metering plate. See Figure 8.

Regarding claim 2, the vortex generating means is a vortex flow generator groove provided on a face on the upstream side of the metering plate so that the vortex flow generator groove can be connected to a wall face of the inlet of the nozzle hole, and a main stream of fuel flowing in the groove is directed to a position deviating from a center of the nozzle. See Figure 8.

Regarding claim 4, the vortex flow generator groove is formed such that the flow of fuel from the outer circumferential side of the metering plate is guided by the groove. See Figure 8.

Regarding claim 5, the nozzle is surrounded by a plurality of grooves. See Figures 8 and 12.

Regarding claim 6 the depth of the vortex generator is constant. See Figure 8.

Regarding claim 7, the shape of the vortex generator is rectangular. See Figure 8.

Regarding claim 8, Fuchs discloses an embodiment wherein the vortex flow generator groove has a function of give a pre-rotation to the fuel so that the fuel can be rotated when it flows into the nozzle hole. See Figure 11 and column 8 lines 38 to 59.

7. Claim 10 is rejected, as best understood, under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,979,802 to Hasegawa.

Hasegawa discloses a fuel injection valve in which a nozzle hole (35) is formed on a metering plate (5), fuel flowing on a face on the upstream side of the metering plate is injected outside of a face on the downstream side of the metering plate and a needle (8) having a forward end face (72) opposed to the metering plate is arranged on the upstream side of the metering plate, the fuel injection valve comprising a vortex flow generator means (73) for making a flow of fuel passing in the nozzle hole from into a vortex flow, wherein the vortex flow generator mean is a **guide groove** formed on the forward end face of the needle. See Figure 4.

8. Claim 10, as best understood, is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,984,211 to Sugimoto et al.

Sugimoto discloses a fuel injection valve in which a nozzle hole (6) is formed on a metering plate (5), fuel flowing on a face on the upstream side of the metering plate is injected outside of a face on the downstream side of the metering plate and a needle (7) having a forward end face opposed to the metering plate is arranged on the upstream side of the metering plate, the fuel injection valve comprising a vortex flow generator means (4) for making a flow of fuel passing in the nozzle hole from into a vortex flow, wherein the vortex flow generator mean is a **protrusion** formed on the forward end face of the needle. See Figure 2.

Allowable Subject Matter

9. Claim 3 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,161,782 to Heinbuck et al discloses a fuel injection valve having a metering disc and multiple vortex means leading towards one nozzle (Figure 7). U.S. Patent No. 6,708,904 to Itatsu discloses a fuel injector having a metering plate and vortex means. U.S. Patent No. 5,924,634 to Arndt et al. discloses a fuel injection valve having a metering plate and vortex means. U.S. Patent No.

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5,244,154 to Buchholz et al. discloses a fuel injection valve having a metering plate and vortex means. U.S. Patent No. 6,695,229 to Heinbuch et al. discloses a fuel injection valve having a metering plate and vortex means. U.S. Patent No. 5,899,390 to Arndt et al. discloses a fuel injection valve having a metering plate and vortex means. U.S. Patent No. 6,273,349 to Fischbach et al. discloses a fuel injection valve having a metering plate and vortex means.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seth Barney whose telephone number is (571)272-4896. The examiner can normally be reached on 7:30am-5:00pm (Mon-Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Scherbel can be reached on (571)272-4919. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seth Barney
Examiner
Art Unit 3752

sb



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